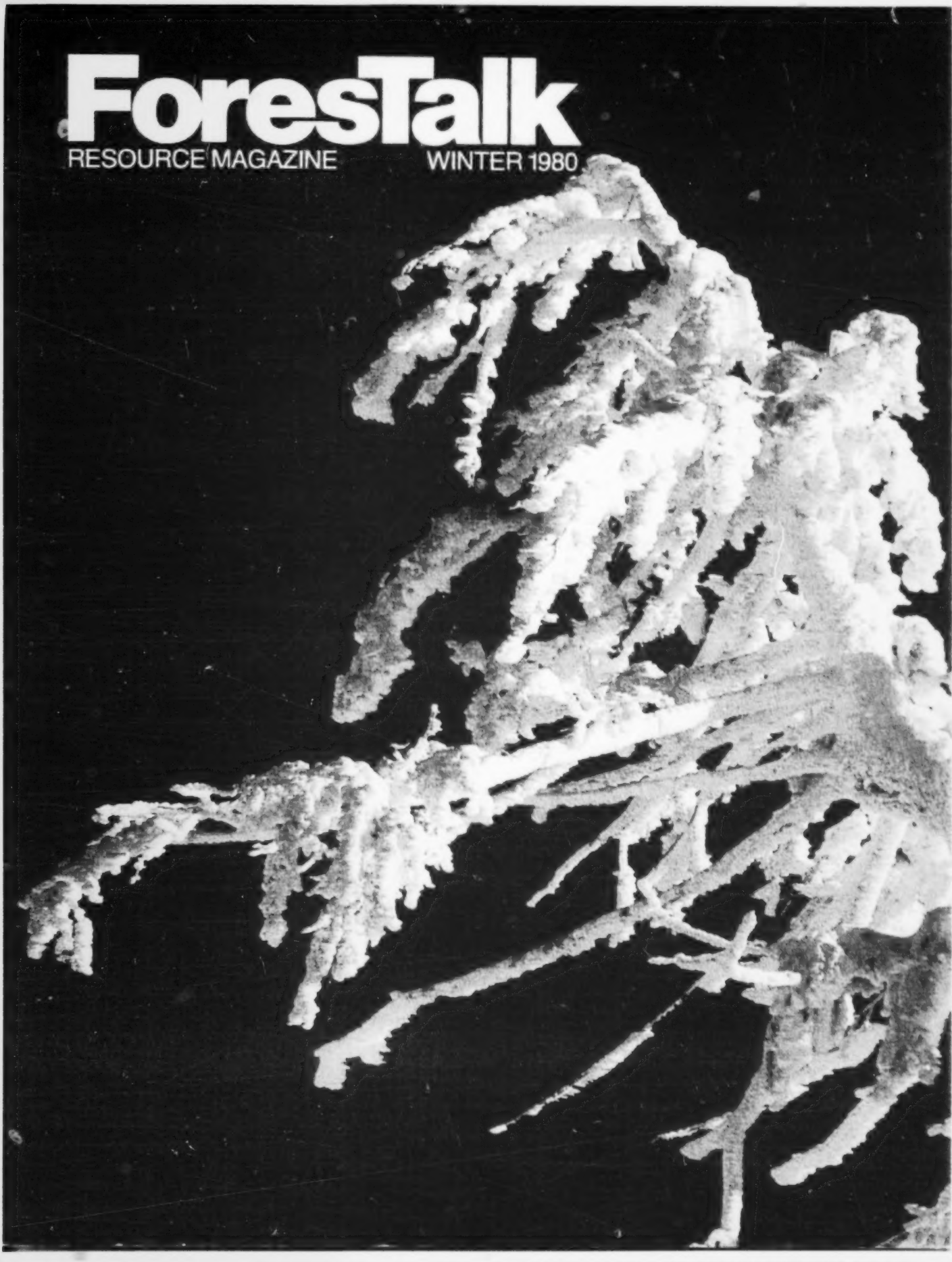
ForesTalk

RESOURCE MAGAZINE WINTER 1980



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ForesTalk

Volume 4 Number 4 Winter 1980

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The Ministry of Forests has been especially busy over the past year. Most notably, the publication of two landmark documents — *Forest and Range Resource Analysis* and *Five-Year Forest and Range Resource Program* — heralded a new standard for forest management in B.C. The Ministry's internal reorganization program, which is well on its way to completion, is now enabling Ministry personnel to be even more effective in carrying out their forest, range, and recreation management mandates. Furthermore, a number of Ministry white papers have been circulating throughout the forest industry to stimulate discussion on some of today's pressing resource management issues.

And nineteen eighty-one promises to be no less active.

Tom Waterland

Hon. Tom Waterland, *Minister of Forests*

Province of British Columbia — Ministry of Forests

Winter in B.C. takes many forms. Along much of the coast a chilling rain marks the season, but occasionally this rain turns to snow. Then on a cold, sunny day – if only for a short while – the trees gleam brilliantly against the backdrop of blue sky. North Vancouver freelance photographer Bill Staley took advantage of such a day to provide us with this issue's cover photograph of a snow-laden mountain hemlock on Vancouver's Mt. Seymour.

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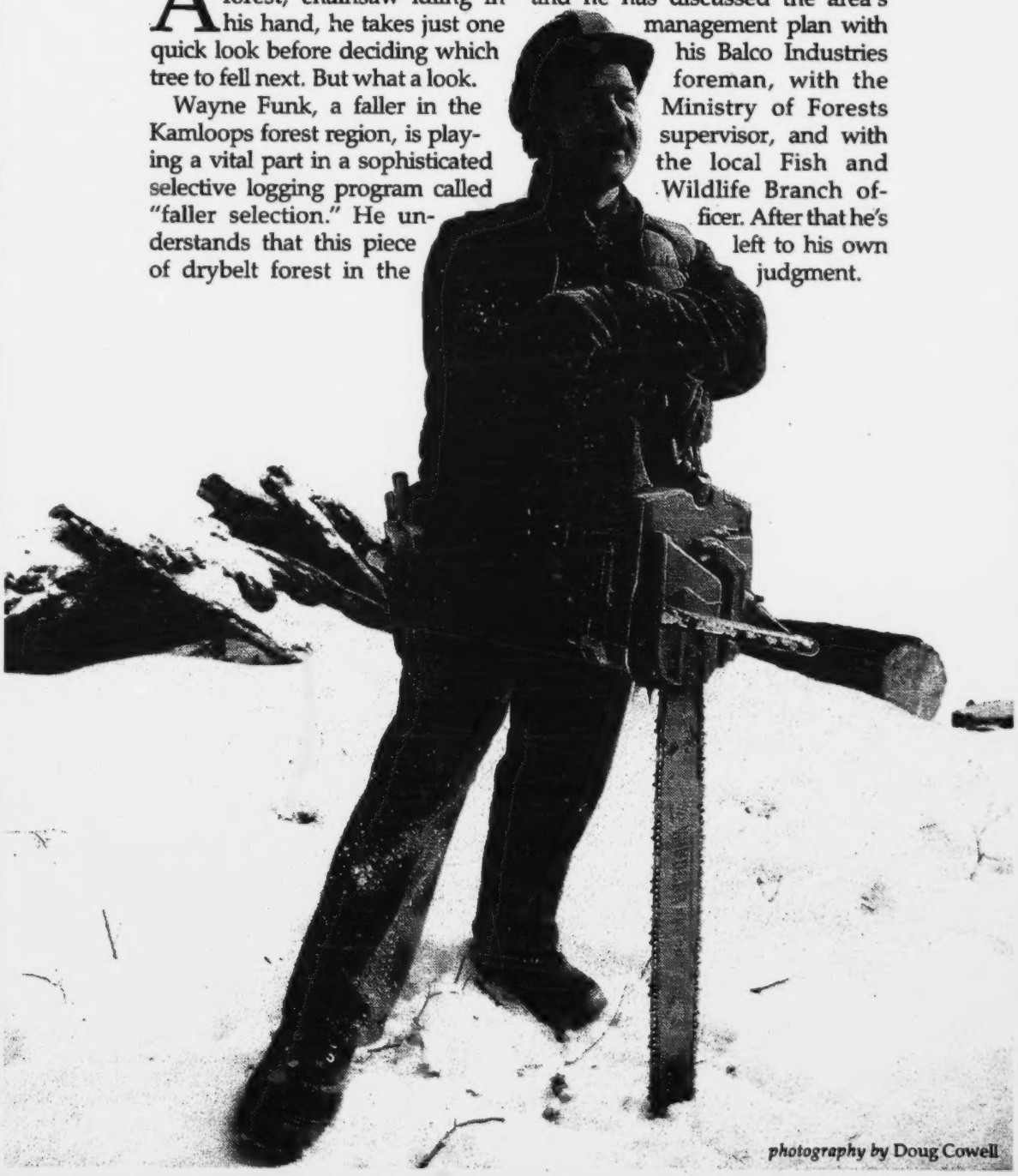
IN THE HANDS OF THE FALLER

by Doug Cowell

As he moves through the forest, chainsaw idling in his hand, he takes just one quick look before deciding which tree to fell next. But what a look.

Wayne Funk, a faller in the Kamloops forest region, is playing a vital part in a sophisticated selective logging program called "faller selection." He understands that this piece of drybelt forest in the B.C. interior has a number of uses, and he has discussed the area's management plan with his Balco Industries foreman, with the Ministry of Forests supervisor, and with the local Fish and Wildlife Branch officer. After that he's left to his own judgment.



photography by Doug Cowell

When barely an inch of wood remains uncut, he hears the wood begin to crack. The backcut opens, and he dances backwards and out of the way. But Wayne Funk the faller is also Wayne Funk the forest steward – the key to the faller selection program. He carefully selects each tree he fells to ensure that the forest continues to provide a wide range of forest uses.

He plans to take two trees from a clump of four Douglas firs. The one nearest to him he will let fall the way it leans; the second will be wedged over a bit so it will miss a nearby patch of young trees. He revs his saw and slices smoothly into the first tree. How he makes this cut will determine exactly where the tree will fall. Then, with the eye-hand co-ordination of a practiced faller he flips the saw bar out of the cut and down a few inches to begin the undercut. A few seconds later it meets the first cut exactly and a wedge of wood falls to the snow.

Now, around the back of the tree, he begins his felling cut. Totally alert, he keeps his eyes glued to the tree crown, watching for the first hint of movement. When barely an inch of wood remains uncut he hears the crack. The backcut begins to open and Funk dances quickly out of the way. There is a sigh of branches hurtling through the air, a muffled, earthshaking thump, and a cloud of snow. The tree is safely down and Funk moves on.

Over the next few hours he will work through a stand of 80-year-old to 200-year-old trees, leaving the two biggest ones standing and entirely ignoring a patch of immature trees. He will cut one south-facing patch almost bare and will leave a thicket beside it untouched.

In lower elevations of the Kamloops region the forest type is known as "interior drybelt Douglas fir." In this harsh, dry environment, interior Douglas fir and some Ponderosa pine inhabit the more favourable growing sites; grasslands cover the rest. Clearcutting in this area can cause problems by stripping the ground of its shade cover. Then soil temperatures in summer may rise too high for tree seedlings to survive. Selective logging is a better way to ensure the forest will regenerate.

Keeping that shade, or "thermal cover," and spacing out the remaining standing trees are the most important things Funk considers as he works from tree to tree, harvesting wood but still leaving a forest. If he overcuts in some of the driest areas, it may be 200 years before there's a forest again.

Logging in the Kamloops region began in the 1930s when tie-hackers came in for railroad ties, taking only the larger trees and hauling them out with horses. It was a basic, almost unintentional form of selective logging. Again in the 1950s the same areas were logged, this time to feed portable sawmills. These mills couldn't handle small wood efficiently and so, once more, only the larger trees were taken, leaving the small trees to grow more quickly. By the 1960s and 1970s the area's large saw mills had been established and better road systems made clearcutting popular in the higher elevation forests of lodgepole pine, spruce and balsam. Meanwhile, more sophisticated forms of selective logging were being developed in the low elevation drybelt fir country.

One of the earliest selective logging management techniques used by the Ministry of Forests is something called "diameter limit." If, in a particular area, the average diameter of trees when they reach a harvestable age is, say, 17 inches, that figure becomes the diameter limit. Everything over 17 inches is cut; any tree under that figure is left standing.

In areas where the trees aren't all approximately the same age, however, the system has its drawbacks. Old, stunted trees which should be cleared to make way for new growth are left standing; fast-growing young trees may be harvested too soon in their life cycle.

To get around these problems, the

In this drybelt fir region where the forests meet the rangelands (top), cattlemen can graze their stock in selectively logged areas for up to 20 years. The needs of recreationists are also an important consideration in every cutting plan.

"The essence of the taller selection program," comments Ministry of Forests Resource Officer John Weinard (above), "is inter-agency cooperation." Representatives from the company holding the cutting permit, from the Fish and Wildlife Branch, and from the Ministry of Forests discuss with the company fallers the management plan for each cutting area.

Ministry developed a program whereby paint crews were (and in some cases, still are) sent out to mark each tree to be selectively harvested. This system allows for detailed silvicultural decisions to be made right on the site, so it is ironic that it took a mix-up in a paint-crew operation to pave the way for the development of the taller selection program.

In 1976 a change of plans in a Weyerhaeuser cutting operation resulted in a number of trees being incorrectly marked. The Ministry could have repainted the trees, but instead decided to discuss the revised cutting plan directly with the company fallers. The fallers then went out and did such a good job of telling the right trees under the right circumstances that a new forest management technique — faller selection — was born. Today, nearly 80 per cent of all drybelt fir being selectively logged in the Kamloops district is done by the faller selection program.

"The essence of the program today," says Kamloops Forest Officer John Weinard, "is inter-agency cooperation." Once the Ministry of Forests has issued a cutting permit to a company for a given area, then a Ministry official, a company representative, an officer from the Ministry of Environment's Fish and Wildlife Branch, and sometimes representatives from other concerned agencies, all get together with the fallers to discuss the land management objectives for the site and the best way to fell the trees to meet those objectives. "Now that the program has built up some momentum and the fallers have become used to it," comments Weinard, "it isn't always necessary to set up a meeting for each new area being cut."

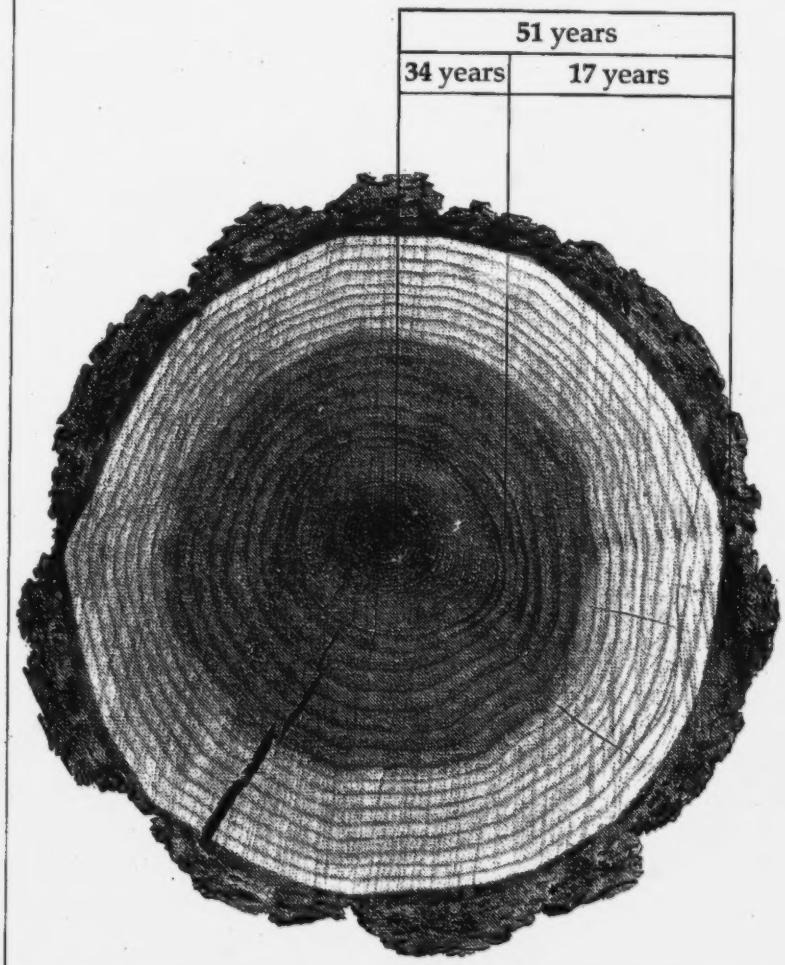
Ranching is a major industry in this drybelt area where the forests meet the rangelands, and cattlemen can graze their cattle in selectively logged areas for up to 20 years following a cut. These forests are also heavily used for such recreational pursuits as hiking, horseback riding, hunting and skiing. Given this extensive demand on the forests, the logging companies and the Ministry of Forests make every effort to accommodate all user groups when planning a taller selection program.

The program concept has been constantly refined since its beginning four years ago. While Weyerhaeuser was a pioneer in the development of the system, today Balco Industries of Kamloops and Evans Forest Products in nearby Savona have adopted it enthusiastically and have contributed much to its advancement.

Trevor Jeanes, Balco vice-president, can't say enough about selective logging and faller selection: "Not only

An active supporter of the faller selection program – and selective logging – is Kamloops' Balco Industries vice-president Trevor Jeanes (right): "Not only can we go back for another cut every 20 to 25 years, selective logging actually increases the productivity of the forest."

A look at the tree rings tells the story. The remaining trees in a selectively logged forest no longer compete for the available sunlight and moisture and so enjoy a much more rapid annual growth rate.



can we go back for another cut every 20 to 25 years, but we actually increase the productivity of the forest."

A look at the stumps tells the story. By counting growth rings and measuring them you can see that a typical tree was about four inches in diameter by the time it was 50 years old. Then, perhaps in the early 1950s, the forest was thinned and the competition for sunlight and moisture among the remaining trees was reduced. The trees had a spurt of growth that lasted about 20 years, until the forest canopy closed in again.

"We've calculated that just by thinning a forest by selective logging we can increase the annual growth rate of a particular tree up to 44 times," explains Jeanes. "On a per-hectare basis we can easily double the production of a forest, and often increase the production of merchantable timber by as much as ten times. Also, by opening the stand up you get more moisture onto the ground. Therefore you get more vegetative cover, more grass for cattle, more shrubs for wildlife browse, and improved tree growth.

"This selective logging program is the salvation of our industry in this area, and the beauty of it is you can do it in concert with the other land users and benefit them at the same time."

One land user benefiting from this selective logging program is the area's deer population. A more open, heavily-thinned forest allows sunlight to reach the forest floor, encouraging shrub growth which is excellent deer browse. Watching to see that logging patterns indeed provide this type of deer habitat is Kamloops Fish and Wildlife Branch biologist Dave Low. But deer management is just a part of Low's concern.

"With something like 400 species of birds and animals in the forest, you have to begin to manage for systems, not just individual species. You have to maintain the systems intact so that you have a forest that is able to protect itself biologically."

Low mentions the chickadee as an example: "When we had an outbreak of spruce budworms in the Fraser Canyon, I noticed chickadees in the Stump Lake area south of Kamloops returning to their nest sites with their bills filled with budworms. It told me that there were budworms in places

other than the Fraser Canyon, but in certain areas the bird life was able to keep them in check."

The way to insure an abundant supply of insect-controlling chickadees and similar cavity-nesting birds is to provide nesting sites for them. Chickadees nest in holes in dead trees hollowed out by woodpeckers and nuthatches. So Low's advice to fallers in the faller selection program is to leave standing any dead trees ("snags") where they are not a safety hazard to workers.

It's lunchtime, so Wayne Funk shuts his saw down and soon is squatting near the fire, cradling a cup of steaming coffee in his hands. He looks ahead to his afternoon's work. There are several snags in the area, all of which he will leave, and three big, old gnarled firs which he also will leave — to make future snags. This is a long-term project. It takes hundreds of years to produce snags like these.

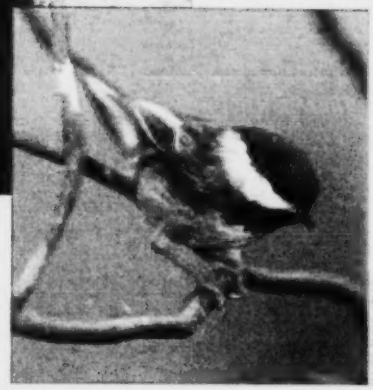
Funk wonders if a Workers' Compensation Board representative will show up on site, and knows what he'll think if he does. The Compensation Board states that snags are dangerous and insists that all snags in working areas be felled. Forest managers insist they be left to maintain the biotic integrity of the forests. It's an area of conflict he has to live with.

Overall, Funk has no regrets. Although working in the faller selection program demands that he constantly be on his toes making forest management decisions, Funk finds the work stimulating, and it helps him be more aware of the many uses the forests are put to. The faller selection program has turned out to be a key element in a program of forest management in the Kamloops area that seems to be successfully fulfilling the concepts of multiple-use.

"We're in this business for the long haul," Trevor Jeanes says. "We've already taken two and three cuts off some stands, so it's worth it to us to make compromises. The most important thing is to be able to go out and settle conflicts in the field. Sometimes when you try and do it in an office you can sit there for six months and not come to an agreement."

Dave Low feels much the same. "The most important thing in wildlife management is to maintain flexibility, to be site specific, and not to get boxed in by regulations. I've worked with these guys for quite a while now and we've come to know each other well, to understand each other's abilities and needs. We've reached the point where we can fight without getting angry. I figure I get about 60 per cent to 80 per cent of what I would ideally want, and I think the others get about the same."

John Weinard sums it up this way: "With the development of the fallers' selection program we can preserve the natural integrity of the forests and enhance their overall use."



Fish and Wildlife Branch biologist Dave Low (left), an enthusiastic participant in the faller selection program, encourages the fallers to consider the needs of animal and bird populations. Among other things he asks that old, dead trees be left standing (centre). These snags are home to any number of forest dwellers, including the chickadee (above right), a bird which helps keep in check such forest pests as the spruce budworm.

But after all the professional advice has been handed out, the final decision on what to cut or leave standing rests in the faller's hands.

The Home of B.C.'s Christmas Trees

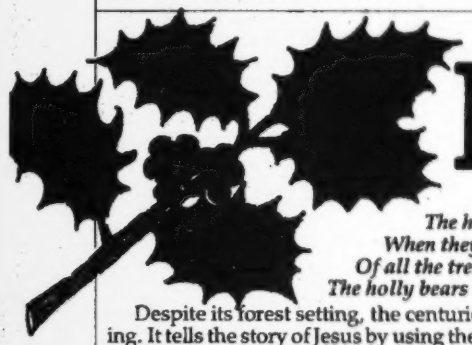
Where did your Christmas tree come from? If you bought it at the supermarket parking lot, it probably came from the drybelt fir region of the East Kootenay. That's where about 80 per cent of the more than 600,000 Christmas trees grown on B.C. Crown land get their start. The environment here suits the growing of Douglas fir Christmas trees because cold winters, scanty moisture and poor soil conditions make for slower tree growth. The bushiest, best-looking Christmas trees have about a six-inch gap between each whorl of branches, a result of the trees' average growth rate. This is much slower than the growth rate in most B.C. forests, but just about right for Christmas trees.

THE ROOTS OF LUMBER

In 568 A.D. a Germanic tribe swept down and took possession of northern Italy. The inhabitants named their conquerors "Langobardi," meaning long beards, and the name was eventually shortened to Lombard. Many years later the Lombards became renowned as expert goldsmiths, travelling abroad to practise their craft. The street on which many of them settled in London, England became known as Lombard Street.

The goldsmiths of Lombard Street later branched out into moneylending and pawnbroking. The pawnbrokers had a storeroom in which they kept the bulkier items of their inventory, and this room became known as the "Lombard room." In time the term evolved into "lumber room."

Many homes in England had a "lumber room" for storing old boxes, furniture, and the like. In the United States the term "lumber" came to refer to milled wood products in general. Today in the U.S.A. and Canada the word "lumber" designates sawn wood products, while in England the term "timber" is used.



A FOREST OF MEANING

The holly and the ivy,
When they are both full-grown,
Of all the trees that are in the wood,
The holly bears the crown.

Despite its forest setting, the centuries-old Holly Tree carol has a religious meaning. It tells the story of Jesus by using the familiar features of the holly tree, including its red berries, white blossoms, and pointed leaves.

The holly bears a prickle,
As sharp as any thorn,
And Mary bore sweet Jesus Christ,
On Christmas day in the morn.

But despite its Christian message the Holly Tree carol apparently originated in the half-forgotten, pre-Christian wood lore of old England, an ancient body of knowledge and belief about the forest where each species of tree was said to hold special powers and qualities. And it seems there were once a number of holly and ivy carols, older than the Holly Tree carol and certainly not Christian in meaning. In fact, they were about the battle between the sexes.

Yuletide, the "pagan" winter festival, was a time of merriment and feasting for people in medieval England long before Christmas became popular. The twelve days of Yuletide were ruled over by Saturn, a god borrowed from the Romans (and hinting of jolly old Santa Claus). Saturn carried a club called a Holly Boy and a wren in a nest of ivy, representing the new year and the old. His rule ended on the morning after the Twelfth Day festival — New Year's Day. A good-luck custom surrounding Yule morning held that the first person over the threshold of one's home had to be a dark man. He was also called the Holly Boy, Saturn's envoy, and the spirit of the new year. Ivy was associated with the female sex and in some places also meant bad luck. According to custom, the last sheaf of grain harvested in a parish was bound with ivy and called the Ivy Girl. The last farmer to finish his harvesting had to keep the Ivy Girl until the following year.

These two bits of folklore became joined at Yuletide as groups of young men and women played the English game of forfeits to see which sex would carry the day, singing the teasingly competitive holly and ivy songs — quite a different meaning from the carol we know today.

DANGER! Cold Can Kill

You've been cross-country skiing for the day. With night approaching you suddenly realize you're lost.

It is a dangerous spot to be in. The combination of cold, wet clothing, wind on exposed skin, and fatigue can bring on *hypothermia*. That's a condition when your body temperature drops to a point (around 34 degrees C) where it doesn't function properly. Your internal thermostat which usually keeps your body at a constant 37 degrees C breaks down. You could be literally freezing to death without realizing it.

So what can you do to try to survive a night in the cold? The best bet is to stop wandering around aimlessly and find a spruce tree or other evergreen big enough to have a sheltered spot under its branches; often the ground around the trunk is dry and protected because of the umbrella-like effect produced by the snow on the tree's branches. It's no hotel room, but it will keep you out of the wind and reasonably dry. That just may make the difference until someone finds you the next morning.

Do you know any interesting facts about forests? Mail submissions to: ForesTalk — Collections, Information Services Branch, Ministry of Forests, 1450 Government St., Victoria, B.C. V8W 3E7. Information should be brief, accurate, and sources included where possible.

Where The Trees Stop

It's difficult to pin down the exact location of the arctic tree-line, the northern limit of forest life. Ecologists can easily locate a *boreal forest* (one that is closed, like most B.C. forests); a broken forest (which in arctic regions is called *taiga*); an open landscape with scattered trees (known as *forest-tundra*); and the treeless tundra. But where do they draw the line on the map showing where the trees actually stop? The problem is made more difficult by the fact that vast stretches of northland have seldom been travelled, let alone studied.

The kinds of trees that grow in the far north are quite different from region to region. In northern Canada the tree species that extend furthest north are white and black spruce. In eastern Canada, where the tree-line dips to about the same parallel as Fort St. John, tamarack is also common, with scrubby alder and willow as understorey species. Towards Alaska, above 70 degrees north, isolated stands of alder and willow grow wherever they can find shelter from the bitter wind. White birch, trembling aspen and balsam poplar show up there too.

In Scandinavia and European Russia, Scotch pine is the dominant coniferous species, but birch and alder also make up forest stands (these deciduous species are also found scattered about in other arctic regions). Further east in Siberia the Siberian larch is the dominant species. It forms the tree-line as far north as the 73rd parallel, except near the Arctic Ocean where the larch hides behind spruce.

PHOTO VANCOUVER CITY ARCHIVES

Look what they've done to my town

The sleepy-looking hamlet beyond the wharves is "Granville" or Gastown — two years before it was destroyed by fire in 1886. In back of the waterfront buildings (hotels, stores, saloons and the odd home) was Water Street, then called Front Street; the forest ended where Cordova Street is now, and Hastings Street was deep forest. The forests are gone now, and as the more recent photo shows, the job of rebuilding the fire-levelled community is coming along nicely.

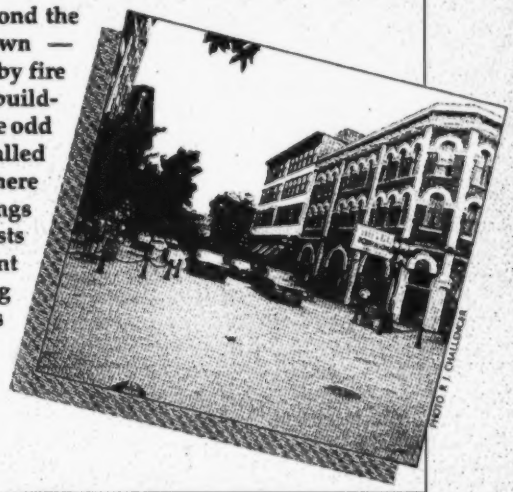


PHOTO R.J. CHALLONER

Minding your BTUS

If you're heating your home with wood, you'll save a lot of trips to the woodpile if you choose a wood with a high heating value.

A kilogram of Douglas fir produces the same amount of *heat energy* as a kilogram of alder, or of any other wood. But different wood species have different densities, which means a stick of Douglas fir, for example, is heavier than the same-sized stick of alder. So it has a greater *heat value*. Add up all the sticks in a cord and the difference is significant.

Here's a survey of the heat value of B.C. woods, ranked by the amount of heat energy (in millions of British Thermal Units, or BTUs) produced in burning one cord (4 × 4 × 8 feet solid) of air-dried wood (20 per cent moisture):

High Heat Value *(25-30 million BTU/cord)*
Gary oak

Moderate Heat Value *(20-25 million BTU/cord)*

white birch	western larch
Douglas fir	broadleaf maple

Low Heat Value *(15-20 million BTU/cord)*

western hemlock	western red cedar (and other cedars)
lodgepole pine (and other pines)	black cottonwood
red alder	sub-alpine fir (and other "balsams")
trembling aspen	Engelmann spruce (and other spruces)

A commercially-made firelog, Pres-to logs, actually wins the battle of the BTUs hands down. With a measured 63,750 BTUs per log, Pres-to logs pack an amazing 68 million BTUs per cord — more like the heat value of high-grade coal.

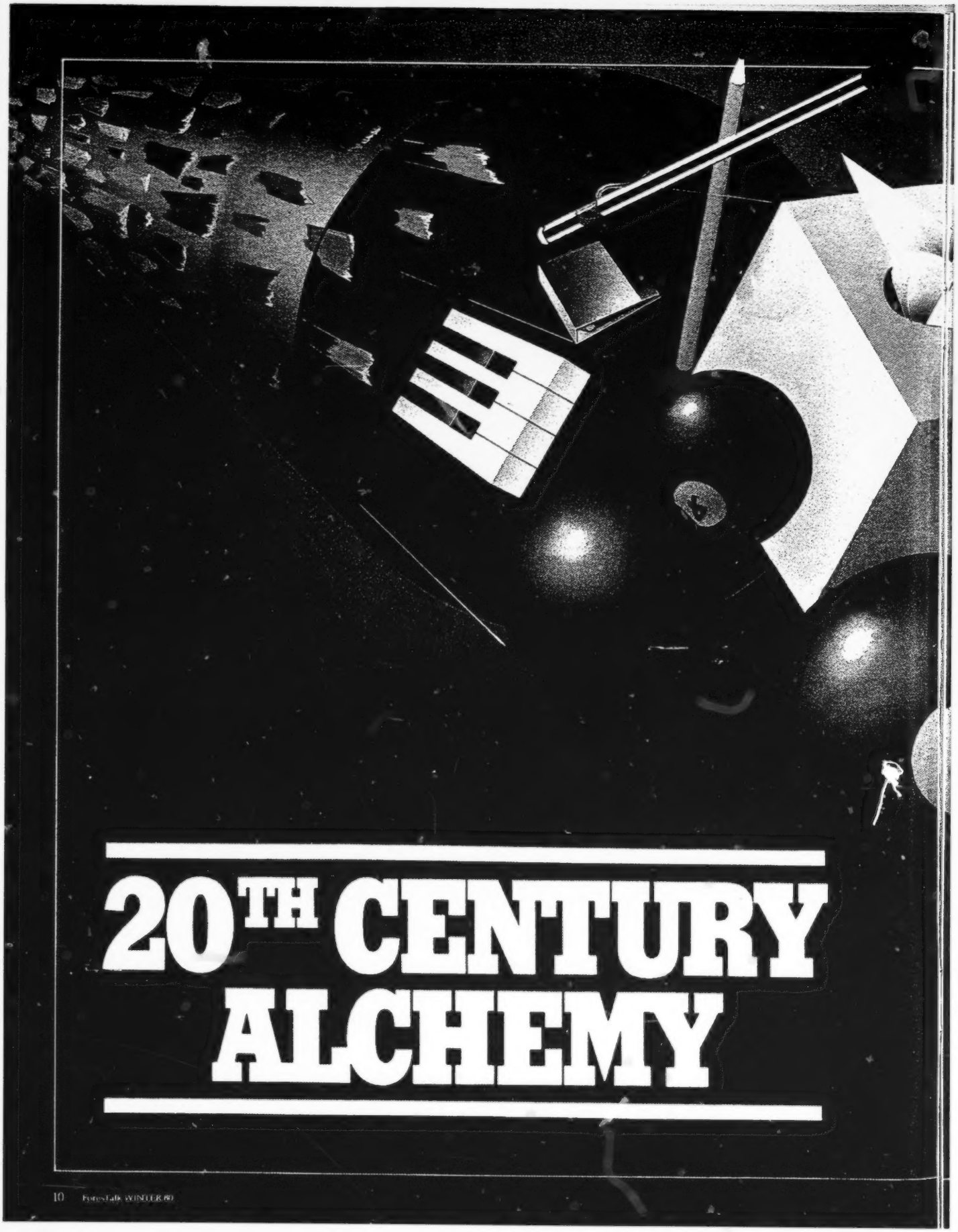
Tales Tree Rings Tell

As well as indicating the age of trees, annual growth rings can also reveal the dates of natural phenomena such as forest fires.

When low intensity fires spread through the forest the trees are for the most part unharmed, except for the formation of a few fire scars. A small portion of the cambium, the zone of tree growth, is killed by the heat of the fire and the bark falls away, leaving a scar.

By analyzing these scars, foresters can determine the dates of past fires with surprising accuracy. A recent study found that a Douglas fir and ponderosa pine forest near Kamloops experienced at least 22 ground fires between 1542 and 1927.

The study of fire scars enables foresters to estimate how often fires have burned through particular forests, how large an area these fires covered, and what effects periodic burning has had on the vegetation.



20TH CENTURY ALCHEMY

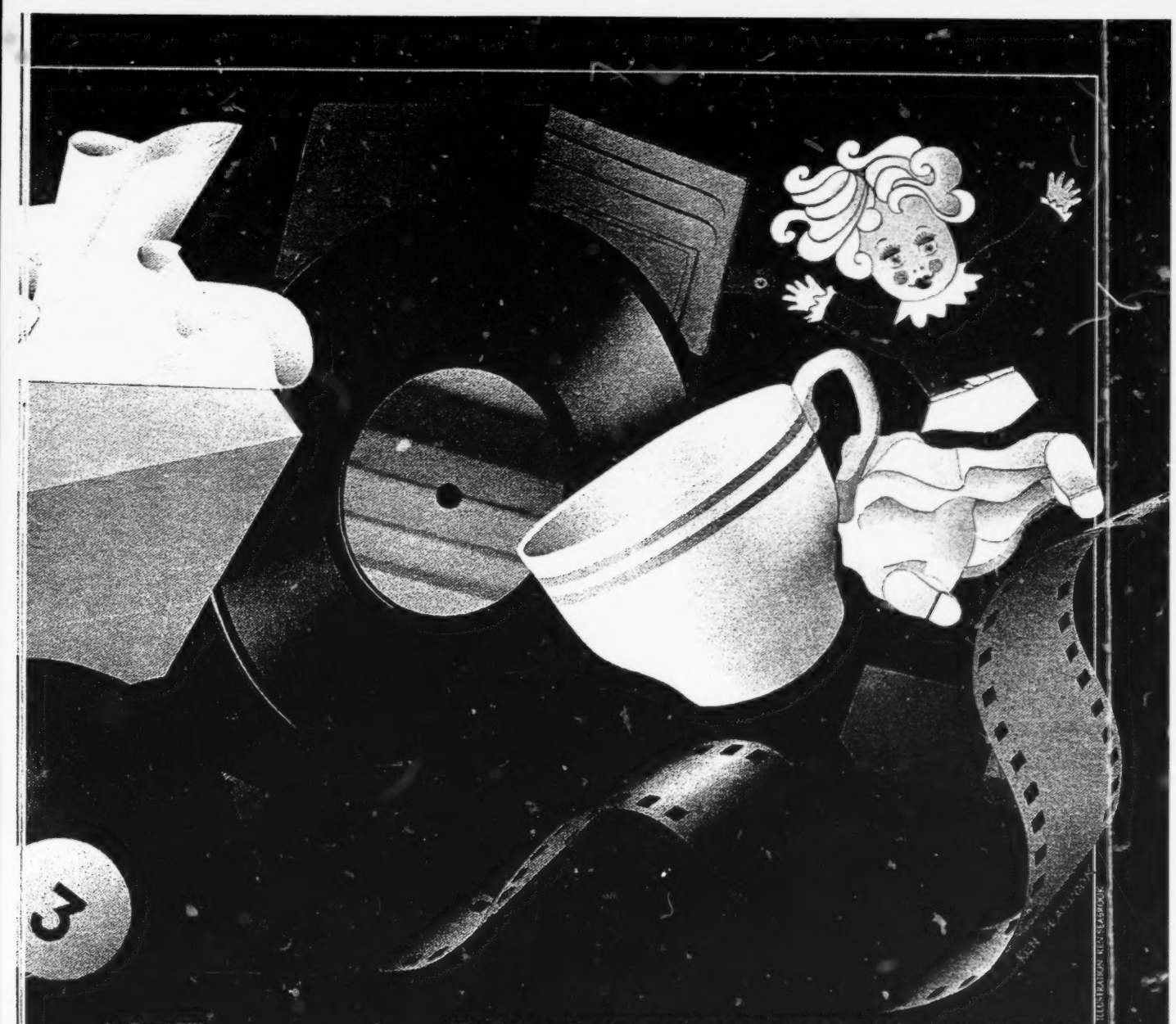


ILLUSTRATION KEN SEABROOK

by **Grant Ellis**

Alchemists of the middle ages sought the ability to turn base metals into gold. Today's engineers and scientists work with wood, turning balsam into bowling pins, fir into fountain pens, and pine into piano keys. Even the urban apartment dweller who goes for days without seeing a tree is completely surrounded by wood in its many disguises.

Wood in a plainly recognizable form is, of course, found everywhere. We see it in baseball bats, brush handles, pencils, casks, and cellos; we use it in furniture, toothpicks, matches, baskets, and doors. But more and more, the industry's alchemists are turning out wood products from a relatively recently discovered resource: wood waste.

Slabs sliced from logs become lath. The edgings trimmed from lumber are turned into moldings, flooring, handles, and dowels. Waste particles are pressed into sheets. Left-over lumber ends are finger-jointed to form a piece of wood of any desired length. Much of the mill waste that once was burned is now converted to chips and sold to pulp mills. Chips, in fact, have become an international commodity. At veneer mills, however, where lathes peel wood from logs in thin sheets, most of the waste is in the form of veneer-thin pieces. Here, a different alchemist's touch is needed.

At Canadian Forest Products' New Westminster mill, waste from veneer lathes falls to a conveyor and is spirited away to be ground and soaked into a mash. It is then pressed, dried, embossed, and — ironically — printed to look almost as realistic as the wood that went into it. It may be made to look like brick, stone, or stucco, but in any case it winds up on living room walls as hardboard panelling.

An imported Philippine wood called lauan is often sold in B.C. for panelling. But B.C.'s alchemists are trying to replace lauan with a domestic product. At Northwest Panelboard's Smithers plant, due to open in December, sawdust and planer shavings will be hot-pressed and bonded into particle board, then sold to hardboard manufacturers for finishing. It is hoped, says John Cook of Springate & Associates, consultants to Northwest, that the board will compete handily with lauan.

In conjunction with assorted mechanical and chemical treatments, twentieth-century alchemists funnel wood chips through intense heat to produce a variety of cellulose-based products (illustration pages 10-11). Another wood alchemist's trick is to turn the wood waste from sawmills into useable products. Here, lumber edgings are changed into flooring, and waste particles are pressed into sheets of wood. At veneer (plywood) mills, the veneer waste is ground, soaked, and then pressed into hardboard panels.

This innovative use of waste is significant to B.C.'s economy, and it extends the usefulness of every tree cut. But the storing of waste for later use may have its environmental problems. B.C. Ministry of Environment engineer George Giles points out that rain leaches many substances from stored wastewood into groundwater or streams. In strong concentrations these substances are deadly to fish. "I've seen streams," says Giles, "where the fish just can't get past a certain stretch of water because of the leachate concentration." For this reason, and others, some mills convey waste immediately to a separate plant for processing, or store it on concrete slabs.

Wood's versatility really begins to show up when it is taken apart chemically. If you cut across the grain of any piece of wood and look at it in cross-section under a microscope, you see a honey-comb of cells. The cells are called cellules, and the material they are made of is called cellulose — the primary substance of wood. Within the cells are gums, fats, tannin, and other substances. A substance made up mostly of lignin binds the cellules together. Any number of useful products can be processed from these wood components, and there are two basic ways to go about it.

The simplest way is distillation — cooking wood slowly to extract chemicals from it. This process (which goes on — unwelcomed by anyone but chimney sweeps — in the airtight wood stoves that heat many B.C. homes) yields products like wood creosote, tar, acetic acid, and rubbing alcohol. Another process, fermentation, converts wood to fuels like alcohol.

The second major way to break down wood is to remove binding materials from the cellulose by means of heat, chemical reaction, and mechanical processes. The object is to come up with cellulose fibre and to collect useful byproducts. This is what pulp mills do. The processes may differ from mill to mill, but all of them break the lignin's hold on the cellulose, separate the cellulose fibres, and separate the fibres from other substances.

At the sulphite pulp mill in Port Alice on Vancouver Island, digesters (pressurized cooking tanks) four storeys tall cook wood chips of specific tree species in a heated chemical solution. The dissolving lignin reddens the mixture. When the blow valve at the bottom of the tank is released after four hours, some 70 tonnes of chips and 180,000 litres of fluid rush through a steel conduit to a blow tank. Relieved of pressure, the chips explode into individual fibres. These fibres can then be recombined to make just about anything.

Because a single pulp mill may use 100 million litres of water a day, the pulp milling process has come under scrutiny lately. Government agencies control pulp mill pollution in B.C., and it is not uncommon for a single mill to spend tens of millions of dollars to control and recycle its effluent and emissions. Newer mills have pointed the way in pollution control.

The products made from pulp fall into two classifications: fibre products and chemical products.

We might get along without wood fibre products, but it's difficult to see how. Everything we read is printed or written on them. We also carry groceries in them, start fires with them, line bird cages with them, paper walls with them. Without them, there would be no maps, no paper money, no cheques, no mail. We would have no toilet paper, no facial tissues, no disposable diapers, and nothing to wrap gifts with.

Treated in a wax bath, B.C. paper goes to Japan as "twistings" for candy. It winds up bearing full-colour

photographs in magazines like this one. It is turned into shoe lasts, luggage, butcher paper, wallpaper. It becomes fruit boxes, shoe boxes, shipping cartons, jewelry boxes.

MacMillan Bloedel, one of the companies making fibre containers in British Columbia, is experimenting now with the use of cedar chips to produce fibre for corrugated containers. Elsewhere, MB has produced special travelling cases for falcons and biodegradable backpacks for teams climbing Mount Everest. Crown Zellerbach, in its 600-person Richmond plant, makes corrugated containers and 150 other products, including tissues, towels, napkins, bags, and wrappers for over-the-counter hamburgers. Newsprint, however, is B.C.'s biggest single seller in paper products; millions of people worldwide get their daily news on B.C. newsprint.

All of this fibre material (or, at any rate, most of it) is extremely useful; we cannot imagine life without it. But it does contribute to an enormous social and environmental problem. Canadians spend half a billion dollars every year to dispose of their garbage. B.C. generates about nine hundred thousand tonnes yearly, and much of this is disposable wood-fibre material. It must be collected, then disposed of — a king-sized problem. Recycling is part of the answer.

Whitfield Enterprises, a Richmond firm, shreds and hammers the fibre out of newspapers into a wood-like consistency. This "Celufibre" is the most common form of blown insulation used to reinsulate old houses. Belkin Packaging, at its Vancouver facility, takes newspapers and compacted cartons from supermarkets and turns them into new cartons and numerous other products — soft drink cartons, roofing felt, and almost every grade of paperboard. But the abundance and cheapness of paper and cardboard products — especially packaging — encourages most people to discard them.

Wood chips brought by barge (above) to Port Alice on northern Vancouver Island wait their turn to be transformed into rolls of pulp (top) in B.C.'s only sulphite pulp mill. Modern applications for sulphite pulp include kitchen countertops, luggage, and moulded automobile dashboards.

Pulping Byproducts

Pulping processes can yield a wide variety of commercially important byproducts.

The substances within the cells of some woods yield both turpentine and alcohol and their derivatives, which are used in paints, lacquers, soaps, polishes, and cleaning fluids. Lignin is used to make soil conditioners, plastics, tanning materials, road-building materials and oil-rig drilling mud.

Vanillin, a lignin derivative, has a pleasing taste much like natural vanilla, which is becoming costly and hard to get. At least three plants in North America are extracting powdered vanillin from the spent chemicals of sulphite pulp mills, and the idea of a Canadian mill has been considered. Vanillin derivatives are used in the preparation of prescription drugs, especially those used to control arthritis and hypertension, and in perfumes.

Modern alchemists can take cellulose fibre, change it chemically, and convert it into a solid plastic or to a filament that can be woven into fabric.

These processes date from the 1850s, when French and German chemists combined nitric acid and cellulose and came up with two important forms of nitrocellulose. One was guncotton or pyroxylin, an explosive in use today. The other was collodion, a solution that dried to leave a clear

plastic coating. Then in 1870 American John Wesley Hyatt, searching for a substitute for ivory in the manufacture of billiard balls, combined nitrocellulose with camphor and certain fillers to produce a new substance that could be softened by heat, molded, and cooled to a hard, rigid strength. He called it celluloid. Next, in 1905, came cellophane, followed in the 1930s by injection-molded plastics formed by heating cellulose powder and injecting it into a mold. These products are everywhere today — in fountain pens, toys, appliances, unbreakable china, and a thousand other things. Among the more exotic celluloid products are artificial hair, phonograph records, sponges, and safety glass.

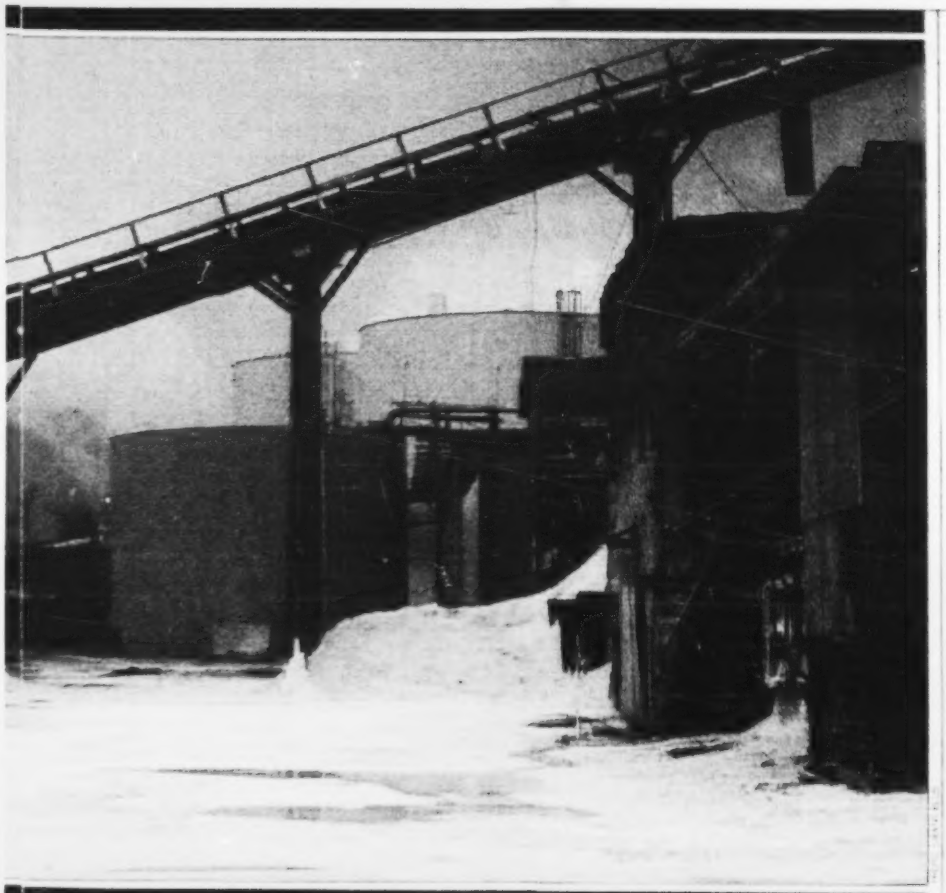
The original source of the cellulose used by those early experimenters was cotton, which (unlike wood) yields cellulose without chemical processing. But trees have the advantage in harvesting, transportation, and processing, and industry turned to trees as a more convenient source of cellulose. Today, engineers are finding new applications for cellulose pulp. Impregnated with latex and dye and etched, it has become artificial leather. Impregnated with heat-setting resin, it has become kitchen countertops. More recently, it has become luggage, molded automobile dashboards, and firewall covers.

The making of fabrics from wood cellulose dates back to the search for artificial silk in the late 1800s. In 1884, French Count Hilaire de Chardonnet developed a process still in use today: a solution of nitric acid and wood cellulose is squirted or drawn through a narrow opening into a gas or a liquid. The stream of cellulose solidifies into a filament that we now call rayon. Manufacturers adopted the process in 1890, but the explosive properties of nitrocellulose made it dangerous. Within 15 years three other processes appeared. Two of them dissolve cellulose chemically, then restore it to its original chemical state as a filament or thread; the third is the acetate process, which produces a completely different substance. Acetate can be spun into thread, spread into sheets, or treated to make plastics.

Cellulose fabrics are everywhere today. Acetate has been a favoured material in the Paris fashion scene for more than 30 years. Cellulose-based fabrics are used for disposable diapers, disposable gowns and masks for hospitals, disposable underwear, even disposable graduation clothes. They are used for gauze and cigarette filters. Clear acetate is in wide use in many forms. Cellulosics, in fact, cover the earth. But with them come nagging problems.

One is that they require the kind of cellulose pulp that can only be made by pulp mills using the sulphite process. And sulphite mills have had an unfavourable reputation for harming the environment. Paul Thomas of Econotech, a New Westminster consulting group specializing in the forest products industry, feels that the repu-

***Sulphur** (centre) is basic to the making of pulp, and so is the intense heat of massive furnaces (far right opposite). The objective is to make wood explode into individual cellulose fibres. Further chemical treatments can then convert these fibres into a solid plastic or a filament. From there it is just a short step to billiard balls, rayon thread, and countless other cellulose-based products. In the past, sulphite pulp mills developed a reputation for harming the environment, but new or updated mills are overcoming most pollution problems.*



While competition from the petrochemical industry (e.g. polyester, nylon) has limited the market for chemical cellulose (e.g. rayon, acetate), rising oil prices and the fact that wood is a renewable resource should ensure a future for cellulose-derived products.

tation is undeserved — at least by new or updated mills.

"The old sulphite mills got a bad name environmentally because they could not recycle their liquor," says Thomas. "But a modern sulphite mill should be at least as clean as a kraft mill, and any smell should not be noticeable beyond the immediate vicinity." B.C.'s only sulphite mill is the Port Alice facility, which began operation during World War I. In 1971 it changed from a calcium to an ammonia process to permit the recovery of chemicals and to improve output. Over $50 million has since been spent on water pollution control, and millions more on controlling flue gases. (The mill recently changed hands when its former owner, Rayonier, sold to Western Forest Products, a new company jointly owned by British Columbia Forest Products, Doman Industries, and Whonnock Industries.)

Currently, the market for high-quality chemical cellulose has levelled off, and the reason it isn't growing is that those other alchemists, the ones who work with petrochemicals, have been competing very successfully with cellulosics. Perhaps they have just been better promoted, but whatever the reason, polyester and nylon synthetics outsell rayon, acetate, and even cotton. Polyvinyl, polypropylene, polystyrene, and other petrochemical products are popular with consumers, but time and shrinking oil reserves are on the side of renewable resources. Paul Thomas is among those who foresee a place in the future for sulphite mills and wood-derived cellulosics as petrochemicals become scarcer and more expensive.

The other, more troubling question about cellulose chemical products is the same one addressed to fibre products (and to petrochemical products, for that matter): how much disposable material can — or should — the world tolerate? And plastics, not readily biodegradable, are of more serious concern than fibre products.

While these concerns are serious and must be dealt with, one thing is certain. Contemporary wood alchemists enrich our lives with the products they create.

Forest Rain

The Essence of Life

by Gary and Judy Green

Clouds of sombre grey fill the skyline; mist rises from the shrouded forest cover. Moisture gathered from the waters of the Pacific is deposited on the western slopes of the Coast Mountain Range by the prevailing winds.

Torrential downpours and creeping mists create rain-forests on the western slopes. Here the annual rainfall is over one hundred inches. Towering Douglas fir, western red cedar and hemlock unite in a dense canopy of green and black. Surplus water absorbed by the trees is exuded from special pores at the leaf tips.

Gametophytes, ferns and their allies, rely on this encounter with moisture to carry out their reproductive cycle. Propagation depends on single drops of free-running moisture on the underside of the leaf to carry the sperm to the plant embryo: a minute distance, yet impossible without the drop of water.

PHOTO DOROTHY HARGERT

Seeds, lying dormant on the forest floor during dry periods, burst into life with the touch of moisture. Sunlight breaks through the rising mist, a world of light reflected by millions of water drops. A spider's web becomes a necklace of crystal prisms; the spider suddenly rushes from its cover to drink the droplets.

PHOTO GARY ANDREW GREEN

PHOTO DOROTHY HARGERT

The clouds and mist finally give way to the energy of the sun, and the cycle of life – use and re-use – goes on.

ForesTalk
Interviews

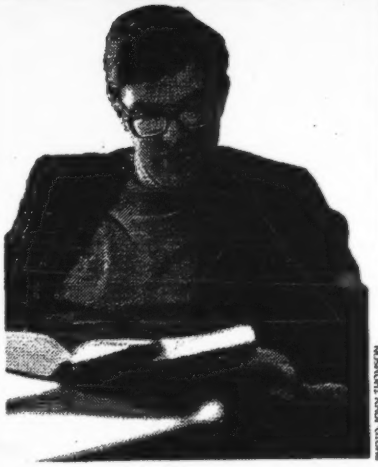


PHOTO: JOHN THOMSON

John Helliwell

by **Peter Grant**

Should B.C.'s forest industry use its vast surplus of wood waste to produce energy? Would there be a big pay-off for the province if it did?

One person who spends a lot of time trying to answer these questions is Dr. John Helliwell. The U.B.C. economics professor uses computer models of B.C.'s pulp and paper mills – the province's biggest single energy consumers – to study the economic effects of choosing one of several possible energy paths available to the industry and the province. Helliwell's conclusion: The forest industry could come close to energy self-sufficiency using wood wastes, and the whole province would benefit. But first, the prices industry pays for other energy sources will have to change.

John Helliwell's studies of energy and the forest industry are an outgrowth of his interest in economics. A former U.B.C. student, he joined the university faculty in 1967 after 8 years of graduate study and teaching at Oxford. Studies in macroeconomics – the workings of a whole country's economy – led him to focus on more specific economic problems, including the northern B.C. natural gas pipeline when it was first proposed in the early 1970s. In discussing the economics of energy, Dr. Helliwell offers a sweeping view of things to come.

FORESTALK: Why have you been studying the economics of energy?

HELLIWELL: When energy prices are changing rapidly — as they are now — it's important to consider what types of energy are the cheapest to produce and use, both for an industry and for a whole province.

FORESTALK: Why have you focussed on B.C.'s forest industry?

HELLIWELL: The forest industry is a large energy user; it consumes 70 per cent of the industrial energy in the province. And it buys a good part of this energy. On the other hand, it's an important *producer* of energy, with the potential for producing much more, either for its own use, or for sale.

FORESTALK: What's the real issue here?

HELLIWELL: As energy prices rise, it becomes more profitable for forest firms to produce their own energy — that's the theory. In practice, we found that the situation varies from region to region, depending on the availability of hog fuel — wood waste from sawmills — and on the prices of electricity and natural gas.

FORESTALK: Just how much energy could wood waste contribute to B.C.'s total supplies?

HELLIWELL: The potential is big — but it doesn't do to overstate it. At the most, wood waste could provide a tenth of the total electricity generated in the province. Its potential is much bigger in terms of replacing natural gas and oil.

FORESTALK: Do you think the forest industry can become self-sufficient in energy supplies?

HELLIWELL: On balance, the B.C. forest industry isn't going to produce as much energy as it consumes. If it comes close to self-sufficiency, it will be doing a good job.

"A lot of so-called wood waste is simply a result of sawmilling practices not being what they could be."

FORESTALK: How much of the forest industry have you included in your studies?

HELLIWELL: So far we have dealt only with the 18 major pulp and paper mills. But they are by far the biggest users of energy in the province.

A lot of the more interesting issues have to do with sawmills, which have pretty good potential for using wood waste to dry lumber and generate electricity. But the energy picture is quite different in each part of the province. In broad terms, it appears that the interior is where wood waste could most profitably replace fossil fuel and electrical energy.

FORESTALK: What is the most economic use for wood wastes?

HELLIWELL: In some parts of the province, the full heat requirements of the mills can be met by cogeneration — producing electricity along with the steam heat — and there will still be a surplus of wood waste. This raises the possibility of producing even more electricity. B.C. Hydro is already considering this kind of utility project in their Quesnel study. It would be like the big Burrard thermal power plant near Vancouver — but fuelled with wood waste instead of natural gas. This kind of project would only be economic in parts of the province where there's excess wood waste.

"The new mills of the 1960s in the B.C. interior were almost entirely gas-dependent. With the rising value of natural gas, it's now being realized that that was a mistake."

FORESTALK: What about on Vancouver Island? There's a proposal to build a series of electrical power plants that would burn logging residues.

HELLIWELL: The preliminary information we have indicates that those kinds of operations will only be economic in the interior of the province. They aren't very efficient: you don't get more than about 30 per cent efficiency, compared to the 80 per cent efficiency you get in cogeneration projects using high pressure boilers. As well, the use of high pressure boilers on Vancouver Island would use up all the wood waste surplus.

FORESTALK: Given the growing demand for wood waste as a fuel, are B.C.'s wood waste supplies going to increase or decrease?

HELLIWELL: A lot of so-called wood waste is simply a result of sawmilling practices not being what they could be. To some extent, what

"The forest industry has a bigger potential than any other industry for turning higher energy prices from a burden to a profit by producing energy themselves."

is now called wood waste can be cleaned up and used in the pulping process, and sawdust can be used for particle board.

You want to find the highest use for the wood available. Depending on the region, this will include its use as lumber, pulp of different sorts, particle board and fuel. There are a number of reasons for suspecting that more efficient use of the forest resource will cut down on the waste we presently burn.

On the other hand, the high value of wood wastes for energy use is likely to increase the recovery of so-called slash on the forest floor, in turn increasing the available hog fuel supply.

FORESTALK: Given the potential for producing energy from wood waste, why did the forest industry not find it economic to switch to this energy source long ago?

HELLIWELL: When natural gas was introduced into B.C. and when the Columbia and Peace River hydro-electric developments were underway, the prices of natural gas and electricity were such that it was cheaper to use these energy sources rather than doing much with wood waste. So the new mills of the 1960s in the B.C. interior were almost entirely gas-dependent. With the rising value of natural gas, it's now being realized that that was a mistake.

"We seem to be heading towards full utilization of the forest base through mill expansions, but these mills aren't optimal from the point of view of energy use and production."

FORESTALK: What do you think is a realistic price for energy?

HELLIWELL: The new provincial energy policy has promised that energy resources sold to users in the province will be priced at their long-term incremental cost — what it's costing to build new dams, for example, if you're talking about electricity. It's a little trickier with natural gas, because gas is an export commodity, and there's a fairly good medium-term supply at moderate cost. Still, it shouldn't be priced just at what it costs to get the stuff out of the ground, but at what it could be sold for outside the province.

The underpricing of energy affects us all as taxpayers. For example, if B.C. Hydro has to build new high-cost dams to produce low-price electricity, that cost has to be made up indirectly by the consumers and industries of the province.

FORESTALK: How would the forest industry feel about paying a higher price for energy?

HELLIWELL: The industry has one perspective as an energy producer and another as an energy user.

All of us are the same way: we like to buy cheap gasoline, but we're not very happy as taxpayers about having to pay higher income taxes to support a subsidy on imported oil.

When I first talked about these questions in public to the forest industry, I tried to persuade them that they had a bigger potential than any other industry for turning higher energy prices from a burden to a profit by producing energy themselves. They shouldn't align themselves with those who say: "Give us low energy prices for as long as you can and let the future take care of itself."

FORESTALK: Just how much progress has the industry shown in converting to hog fuel to generate its own energy?

HELLIWELL: We're seeing quite a bit of conversion to hog fuel from fossil fuels to provide heat in mills in the interior of the province. That's partly because firms think the present price of gas is going up and partly because, even at today's prices, this kind of conversion is economic. The domestic price of natural gas wouldn't have to get much closer to the export price to make hog fuel an economic energy source for the whole interior.

On the other hand, progress is very slow in generating electricity from hog fuel. It will take a gradual change in the B.C. Hydro pricing structure to get much more cogeneration of electricity along with heat, and to get it taken into the Hydro grid. For example, in the United States, some power utilities have to offer to buy electricity from firms at the same rate as they sell it. That makes cogeneration an economic proposition.

FORESTALK: Overall, are we even headed in the right direction — towards the most economic use of our energy resources?

HELLIWELL: At the moment we're not heading there very fast. We seem to be heading towards full utilization of the forest base through mill expansions, but these mills aren't optimal from the point of view of energy use and production. That's too bad. It would have been better to settle the questions of energy pricing and energy use before these major mill expansions were considered. It's very hard, once you've chosen the scale and site for a mill, to tear it down and rebuild somewhere else on a different basis.

"Skyrocketing fuel prices are what make energy from wood waste economic in the first place. Anyone who thinks wood waste is going to protect us from higher energy prices is looking at pie in the sky."

As far as I know, none of the new mills are coming in with the energy-efficient high-pressure boilers I mentioned earlier. That's an opportunity that's being lost.

I alternate between optimism, hoping that those opportunities will be picked up, and pessimism, fearing this last expansion of mills and the next round of rebuilding won't be as energy-efficient and productive as they could be. Depending on my mood or the time of day, I'm either optimistic or pessimistic.

FORESTALK: It sounds like wood waste isn't going to provide any salvation from skyrocketing oil prices, at any rate.

HELLIWELL: Heavens, no! Skyrocketing fuel prices are what make energy from wood waste economic in the first place. Anyone who thinks wood waste is going to protect us from higher energy prices is looking at pie in the sky. But what we'll have is a more rational and economic use of the forest base, coupled with a more secure— and renewable — energy supply. ◘

"The north is a distinct region, different even from Prince George. It has its own social make-up, weather patterns, and landforms. And it's difficult to understand the character of the region without getting close to it."

– A Fort Nelson Citizen

SORTING OUT THE TIMBER ON B.C.'s LAST FRONTIER

by **Peter Grant**

Planted in the northern wilderness, Fort Nelson certainly has a unique setting. A tapering wing of the Rocky Mountains sits on the western horizon. Climb to the Poplar Hills behind the town and look to the north, east or south: the flatness stretches away, a roadless landscape of low forest growing in muskeg, broken only by meandering rivers, criss-crossing gas exploration lines and the odd glacial ridge. Scrawny black spruce poke out of the muskeg; but when you get down to the nearby banks of the Fort Nelson and Muskwa rivers, you'll find stands of large-diameter spruce and cottonwood.

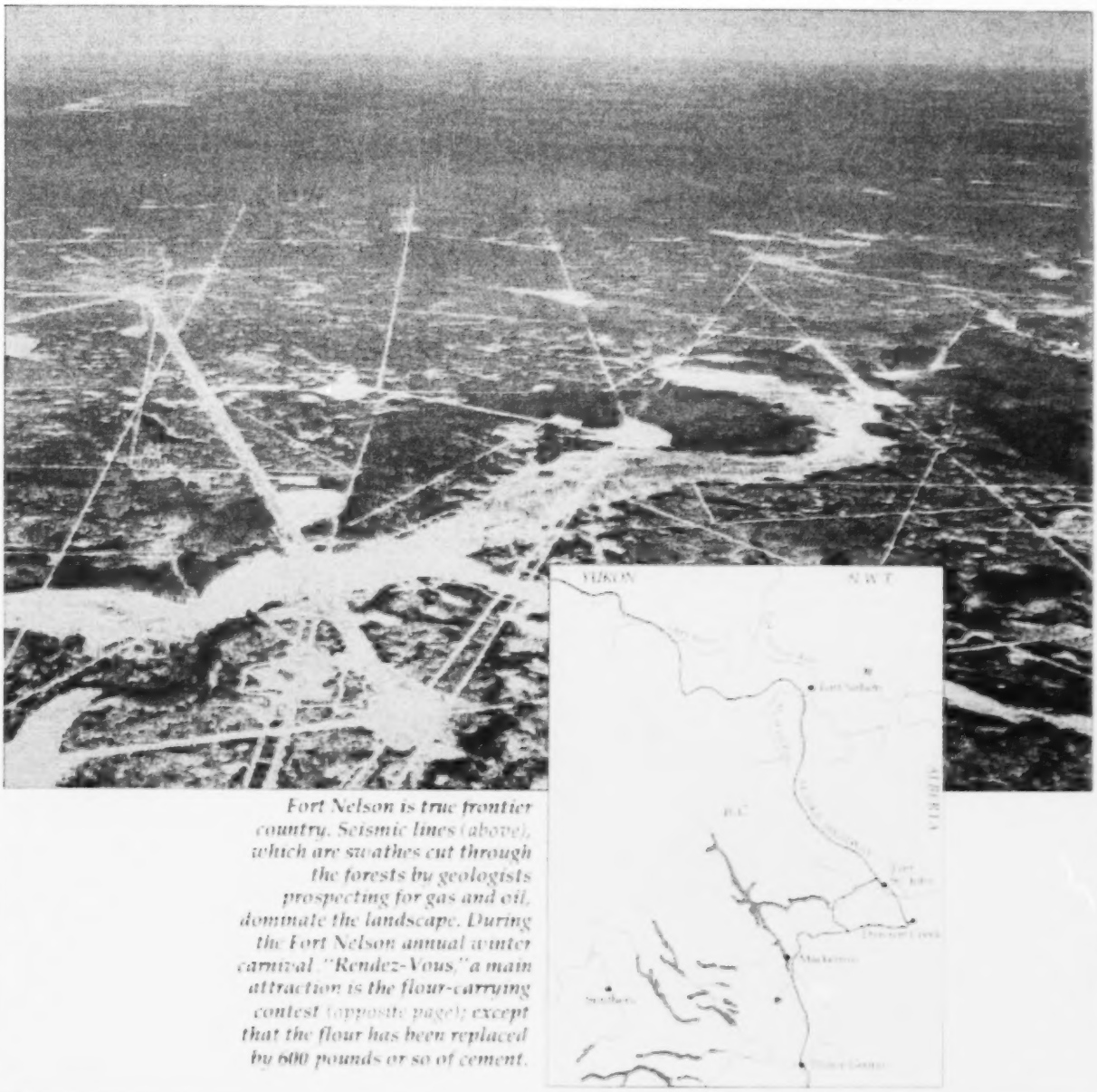
These river-bottom spruce stands are the foundation of a 15-year-old forest industry in Fort Nelson. The premium value of spruce in world markets has enabled various logging firms to overcome a multitude of transportation difficulties, including the problem of staggering distances. It's 400 kilometres (250 miles) south to Fort St. John, the nearest centre, and more than 800 kilometres by road or rail to Prince George. But the spruce supply is limited, and the scale of logging activity may have to change accordingly. In a community the size of Fort Nelson, that change will be felt through the whole town.

photography by Dennis Woodske

Fort Nelson's history is brief, even by the yardstick of a province barely a century old. Although the fort, a Hudson Bay Company post, was founded around 1805 — named apparently, after Lord Nelson, whose naval exploits were fresh in British minds — it was abandoned after a few years when the factor and his family were massacred. Another post and a Catholic mission established in the 1860s fared better, but further amenities came only in dribs and drabs. Then in 1942, with the building of the Alaska Highway from Dawson Creek to Fairbanks, Alaska, Fort Nelson suddenly became a bustling military base of perhaps 5000 and host to a U.S. Air Force airport.

Only since the late 1960s, however, has Fort Nelson developed into a full-fledged community. In rapid succession came a large natural gas refining plant, a sawmill, a B.C. Railway spur from Fort St. John, and incorporation as a village in 1971. The town has blossomed in the last decade: three sawmills and a veneer plant are now grouped around the railhead across the Muskwa River; a dozen motels and hotels cater to the highway tourist trade; and the 5000 permanent residents enjoy the services of a hospital, school district, recreation centre, full-sized year-round swimming pool, daily jet service to the north and south, and supermarkets with fresh produce shipped from Vancouver. (Only when you're outside of town does the remoteness, the distance to any place else, hit home.)

But it's still a part of British Columbia. Pat Griffiths, the Fort Nelson Forest Ranger for the past five years, summarizes the local perspective: "People here hate the attitude held by many in the south — that B.C. consists solely of Victoria and the lower mainland. But they also hate what they see as being a lot of bureaucratic interference from the south."



Fort Nelson is true frontier country. Seismic lines (above), which are swathes cut through the forests by geologists prospecting for gas and oil, dominate the landscape. During the Fort Nelson annual winter carnival, "Rendez-Vous," a main attraction is the flour-carrying contest (opposite page); except that the flour has been replaced by 600 pounds or so of cement.

Logging only takes place in the cold of winter when trucks and other heavy equipment can skim along the frozen muskeg. Jerry Arsenault (below) stops to adjust his load before crossing an ice bridge. The British Columbia Railway (right) is the lifeline to lumber markets in southern B.C.

Much of the province's well-being originates underneath this strange landscape, in the form of trillions of cubic feet of natural gas. Producing fields north and east of Fort Nelson include the huge Yoyo field, by far B.C.'s largest. Together these 20-odd fields yield more than half the province's gas production. In 1978 their gas was worth over $200 million and contributed over $100 million, through permits, leases, and royalties, to the province's revenues.

By contrast, Fort Nelson's forest industry isn't that big, producing only a fraction of the gas industry's wealth. But the town's three companies —Tackama Forest Products Ltd., Fort Nelson Forest Industries, and

Omineca Enterprises — employ eight workers for every one in the gas industry.

In tune with the community's character, the Fort Nelson's forest companies are industrial pioneers. Fort Nelson Forest Industries set up shop in the early 1960s; the other two companies followed several years later. At first there were almost no existing roads to merchantable timber. Today these companies have expanded to an annual cut of over one million cubic metres. Almost all of that is old-growth spruce, which the mills saw into high-quality dimension lumber or peel into veneer. The best timber — high-quality spruce — is confined to the floodplains and terraces of the major rivers. As a result, logging operations out of Fort Nelson have become quite dispersed — now as far as 160 kilometres from the mills.

Logging practices in the north are strikingly different from coastal or southern interior logging practices — another badge of the area's unique flavour. For one thing, logging is confined to three or four winter months when heavy equipment can operate on the frozen muskeg. Trucks cross the rivers on ice bridges reinforced by logs. Brian LaPointe, since last fall the woodlands superintendent for Fort Nelson Forest Industries, quickly discovered how uncertain frozen roads through the muskeg can be when a small crawler-tractor almost submerged after it broke through the icy surface.

Winter-only logging causes the logs to pile up in the companys' yards, because the whole idea in logging in the north is to stockpile enough timber to keep the mills operating for the rest of the year. At times virtually a company's entire annual cut will be stacked in the yards.

Logging in Fort Nelson is a high-cost venture. The main drawbacks are the hauling distances to the mills, the risks involved in keeping a 9-month log inventory on hand, and the distance to markets — it's over 1600 kilometres by rail to Vancouver, and freight rates are high. What's worse, the distance and the sometimes spotty service means northeastern companies lose out on some sales to southern competitors.

"We're at the end of the B.C. Railway line, and suffer most from any problems," says Tackama Forest Products' Don Clutterham. "Two years ago, when there was talk of closing the line from Fort St. John for economy's sake, local interests fought hard to point out that the economic benefits of the line exceeded the costs." The railway stayed.

The fledgling forest industry has also had to contend with the social shortcomings of a newly-settled area. "There was no forest industry infrastructure here when we started," Clutterham points out. "Nobody here knew much about logging or manufacturing, so we had to bring people in." The housing needed to attract workers' families to settle has been lacking, so there's a rapid turnover in the worktorce. Most workers are transient and young; shift supervisors are often no more than 25 years old; millhands average 18 or 19.

But the overriding problem facing the industry is timber supply. At the present rate of harvest, the spruce supply will begin to decline sometime in the next 15 years. That's according to the Ministry of Forests 1979 timber analysis of the Fort Nelson region, the first of many such regional reports expected from the Ministry's province-wide, ongoing Timber Yield Analysis program. But the projections of the Fort Nelson region's forest growth weren't limited to monitoring spruce supplies, and there's the catch. Once the area's hardwood stands of aspen and cottonwood are considered, then there is plenty of timber — enough to log at up to one third more than the present rate.

"It's a matter of timing," comments

A Growing Concern

Fort Nelson people are used to taking issue with "southern" decision-makers, and they're used to demanding a greater scale of involvement in B.C.'s north. A good illustration of the clash of viewpoints is the debate over Fort Nelson's agricultural potential, which for years residents have maintained is considerable. "But," says John Piety (who first came to Fort Nelson in 1942 and returned in the early 70s), "the southern perspective is that the land is all ice and snow." Agricultural backers say the community needs a farming base to be self-supporting, but its potential for food production hasn't been supported. The few individuals who have cleared land for crops are going it alone, fired by the sheer challenge. "We have a special breed of people here," says Charlene Eggers, a farming resident. She adds (perhaps with a little exaggeration): "For what it takes to put this land into production, you could buy the best farmland anywhere."

This gas plant on the outskirts of town highlights the fact that the natural gas found in the Fort Nelson area makes an important contribution to the B.C. economy. The economy of Fort Nelson itself, however, depends much more on the local forest industry, which employs eight workers for every one in the gas industry.

The choice timber of the northland is the black spruce found along the flood plains and terraces of the Forest Nelson River (above) and the north's other rivers. However, since cottonwood trees (right) make up a significant portion of the area's forests, more ways will have to be found to make better use of this hardwood resource.

Dave Oswald, the Ministry's regional planning officer in Prince George. "The companies have to be cutting hardwoods along with the spruce sometime in the next 10 to 15 years. Otherwise the spruce supply could drop off by more than 70 per cent about 20 years down the road, based on present timber utilization standards." To adjust to this revised spruce supply, the area's annual cut may have to drop some 25 per cent — hardly an encouraging prospect for an industry just getting on its feet.

Both Don Clutterham of Tackama and Brian LaPointe of Fort Nelson Industries argue that the Ministry's figures are incomplete, that the predicted shortfall in the spruce supply is seriously over-estimated. In particular, they disagree with the Ministry's contention that large volumes of timber will be destroyed in the future by fire.

Still, there is little doubt about the need — as expressed in the yield analysis report — to offset declining spruce supplies with greater hardwood utilization. The industry claims it has plans to do this, but that a number of set-backs, including rail strikes and difficulties with a very short logging season, have delayed the companies from making further financial commitments at this time.

Using hardwoods is not a simple matter. So far the markets for B.C. hardwoods are almost non-existent, nor do they look all that promising (See ForesTalk Fall 1980). Among the hardwood products the Fort Nelson companies have been studying for possible production are laminated veneer lumber and long-lasting lumber treated by something known as the "perfect wood" process. Other creative ideas for hardwood use include building a thermo-mechanical pulp mill in or near Fort Nelson, or constructing a pyrolytic converter which would generate not only heat and electricity from waste woods, but also a variety of marketable oils and chemicals. By all accounts, such innovations are a few years down the road.

Meanwhile, the Ministry of Forests' regional office in Prince George has been charting the future course of timber harvesting in Fort Nelson, with a long-range view to maintaining the area's forest yield. Twenty-year logging plans are keyed to the new Fort Nelson Timber Supply Area (TSA), a

management unit much larger than the former Fort Nelson PSYU. Just how the Ministry and the Fort Nelson companies will work out actual plans — especially a strategy for cushioning the proposed cutback in spruce harvesting — is uncertain at this point. Fort Nelson is the first Timber Supply Area in the province to reach the stage of negotiations where company licences are up for review. Former Prince George Regional Manager Don Grant admits that it's new territory for everyone involved.

In the new TSA the main trend in logging, says Dave Oswald, will be to continue down the Fort Nelson River and into the Liard River drainage to the northwest, which contains about 60 per cent of the region's potential spruce timber supply. To the south, operations will be directed into the Kotcho River drainage and into the Prophet and Muskwa Rivers to the southwest. As well, the Ministry's tentative plan calls for even more logging of small-diameter upland timber.

The Fort Nelson plan acknowledges that large blocks of northeastern B.C. are likely to remain inaccessible for the time being. Opening them up will depend on the development of several major resource projects planned by other agencies, plus some improvements in forest technology.

Work is already completed on an all-weather road from Fort Nelson to the Yoyo-Sierra gas fields 80 kilometres to the east. The proposed Alaska Highway gas pipeline to the United States — at a cost of $18 billion the largest civil engineering project in history — will pass close to Fort Nelson and will open up thousands of hectares of upland timber to the west. BC Hydro is also considering a series of dams on the Liard River with a generating capacity of over 4000 megawatts; access roads to the sites would open the Liard Plateau to logging. A highway from Fort Nelson to Fort Simpson in the Northwest Territories would provide still more opportunities for the industry.

With the growth of the Fort Nelson region's forest industry at stake — as well as the stability of the town itself — area residents will be watching developments closely. ◘

Adding Up The Trees

There's some good news and some bad news in the Ministry of Forests Fort Nelson timber yield analysis — and the good news is well down the road.

Mature spruce likely will be in short supply between 2000 and 2030; after that the supply will bounce back.

In about 85 years the area's forests will be able to sustain a cut of over two million cubic metres a year – double the current rate of harvest – assuming all species are utilized.

But given the recent pattern of cutting (over 98 per cent spruce, and a bit of cottonwood), the present rate of harvest can only be sustained for about 20 years. Even at that, a severe shortage of spruce is expected.

These findings come from the Ministry of Forests' Planning Branch, and although the figures may be refined in future studies, the conclusions are inescapable. Here are some of the factors involved in the yield analysis for the Fort Nelson Timber Supply Area, which takes in four of the old Public Sustained Yield Units: the Fort Nelson, the Liard, the Kotcho, and the northern half of the Sikanni.

Some 5 million hectares of the total 8.2 million hectares of forestland are considered unmerchantable because either they are inaccessible (there simply aren't any roads into vast stretches of muskeg and foothills), or the timber is too scattered.

There are hefty deductions from projected future timber volumes to account for forests expected to be destroyed by fire – about 1.5 million cubic metres a year. This reflects past experience, especially the 160,000-hectare fire in 1971. These figures are all the more significant when compared to the area's allowable annual cut of one million cubic metres. They are also a major point of contention with the forest industry.

Timber losses due to disease, decay of overmature timber, and delayed regeneration of newly-logged land are also considered. (It takes about 5 years, for example, for new spruce to get established on productive sites in northern B.C.)

Forestland set aside for other uses, including dams on the Liard River and a proposed Toad River Ecological Reserve and park, will total 50,000 hectares in the next 20 years. Another 17,000 hectares have been put aside for roads, oil and gas seismic lines, Hydro lines, and pipelines.

Some 20 per cent of the remaining volume of timber was subtracted from the harvestable total to allow for environmental protection. The environmental protection allowances include the serious problems of river bank slumping, caused by meandering river channels have been eating away at the soft soil in some of the most productive forest sites.

Because of the short winter logging season in Fort Nelson, the forest companies must stockpile logs in order to keep the sawmills operating year-round.

People

Andy Bailey

by Peter Grant

Does northern B.C. have a bright future? Just ask Andy Bailey – engineer, prospector, farmer and hosteller by turns (and sometimes all at once). This Fort Nelson pioneer is the unappreciated architect of his community's well-run services, and he has a vision.

Andy Bailey is surveying the latest in a long line of civic projects he has helped to engineer. To motorists driving the Alaska highway just south of Fort Nelson, the object of Andy's interest looks like a flat stretch of rocky ground. But this unpromising turf — a former gravel pit — is about to become a playground and football field. Andy is lending a hand with the work. "I sit on the Muskwa Heights parks board, so I'm putting in a little bit of my time on the project," he says modestly.

At 64 Andy is quiet, even a little gruff, so you have to press him for more details. It turns out he also put in a little bit of time organizing the Muskwa Heights parks board. Other agencies contributing to this little project were also helped into existence by Andy.

A town doesn't just sprout parks and schools and local government; someone has to get the ball rolling, and in Fort Nelson that someone has been Andy Bailey. He has lived there for almost thirty years (about three-quarters of the town's life-span), and most of Fort Nelson's amenities and services — what determines a community's quality of life — owe their existence to Andy.

Originally from the Peace River country of Alberta, Andy Bailey came to Fort Nelson after a wartime stint with the merchant marine and some years running ships up and down the Pacific coast. A diesel engineer, he moved to Fort Nelson to run the power house for the large military base.

"The people that lived here after the war," he recalls, "were mainly in the armed forces. Army engineers maintained the Alaska highway, and there was a military air base. It was all part of the line of communication with the north."

With a sudden influx of civilians following the discovery of natural gas in 1954, Andy started pushing for basic community services. "When I moved here with my family Fort Nelson was unorganized, so I organized a school district and a hospital district," he says without a trace of self-importance. "And we needed some sewers and a water supply, so I organized our water improvement district. We did all this through the Chamber of Commerce — I was chairman three or four times, I forget how many."

Not one to sit back and relax, Andy also got up a petition to replace the general mail delivery service with a full post office. (His address is still Box 1, Fort Nelson). And before the *Fort Nelson News* started in 1959, Bailey and his family put out a modest newspaper sheet of their own, the *Northwest Courier*. More recently, his devotion to public affairs got Andy involved in bigger projects, including the establishment of a "benefiting area" to widen the community's tax base and the setting up of the regional district.

His most challenging cause? Getting the town incorporated. "As an oil town, Fort Nelson was pretty wide open. There were a lot of people who just wanted it freebooting. There was a lot of money being made, but none of it of any benefit to the town. There was also resistance from the big oil companies to any kind of control. By incorporating in 1971 we started a council with direct representation from the community."

On top of his public-spirited efforts, Andy Bailey has had a varied and active career as a private citizen. One

of his first ventures in Fort Nelson was building the Pioneer Motel, a log building that housed the town's first government agent (before then the closest agent was Pouce Coupe or Fort St. John) and its first radio station, set up by an oil company. Since 1977 Andy and Anne Bailey have lived in the trailer court they started in Muskwa Heights.

Andy still prospects all over the north country, a pursuit he started before the war when living in Atlin. "It's just general geology. I'm always looking out for gold, too. Wherever there's gravel there's a little gold." And he's got a quarter section of land at Mile 317, west of town. Last year, for the first time in more than a decade, he grew crops: 20 acres of rapeseed, 2.5 acres of wheat, and about 3 acres of oats. "I've always wanted to do it, but my time was taken up with other activities. This year I had the time." Andy figures he and Anne will eventually move out to "317."

These pursuits point to a confidence in Fort Nelson's future, but Andy Bailey is more than just confident; he has a vision for the future. He sees the north growing into a major economic force, developing its wealth of timber, natural gas, minerals, hydro power and tourist attractions. And he's doing something to make all this a reality. Andy writes letters, telephones, visits, uses every medium within reach to get the message of northern development across to "the people in Victoria." He figures he must be a familiar figure to most provincial government ministries.

Forestry is a favorite topic of Andy Bailey's, and with the northland supporting considerable volumes of hardwood trees, Andy has for a long time pushed for greater hardwood utilization. "Hardwoods have been downgraded by the industry. I've been to Sweden and other places where they use poplar and birch for pulp. Here the only wood they use is spruce or fir. We have the technology to utilize our hardwood, but the market has developed in spruce."

Andy has also been lobbying for agricultural development around Fort Nelson — with meager results. He and others interested in farming organized an experimental station and ran it for five years with the help of the federal agriculture department. They grew all the crops, he says, you could find anywhere else in Canada. They hoped the government would build a full-scale station. "A gentleman even surveyed the land for it, but they never came through." Consequently, Andy figures there's a bit of a campaign afoot to brand the north as a wasteland.

Andy gets as close as he ever does to showing enthusiasm when he outlines the potential of the north for mineral production. However, to exploit the deposits of iron ore, copper, gypsum, nickel, tin and lead which, Andy says, northeastern B.C. has in abundance, access roads and power are needed. Not surprisingly, he has been pushing for the completion of the all-season highway north to Fort Simpson and the building of a series of low dams (rather than one massive one) on the Liard River to provide a power source for the north's new industries. "The Liard could become something like the Ruhr Valley of Germany," he says, envisaging large industrial plants and a waterway to the north coast.

A prophet is not without honour, save in his own land, and Andy Bailey hasn't garnered much recognition for his accomplishments around Fort Nelson. Of course, as yet there's not much to confirm his vision of economic growth for B.C.'s northeast corner. But just wait. After all, in a few months, kids will be playing football on a grassy field that's now just rocks and gravel.

LETTERS

Rate of Cut Debate

The answer to the enigma posed by your article "Undercutting or Overcutting?" in the Summer 1980 issue of ForesTalk is quite simply that we are overcutting our quality forests and undercutting our poorer and less profitable grades of timber.

Thirty years ago I was one of the foresters involved in the discussions that ultimately led to the setting of standards of wood utilization and growth rates from which were calculated the Annual Allowable Cut (AAC) for the sustained yield program that "was to be" our future forest policy. Today those standards have proven to have been reasonable. The regional AACs that should have been derived from them would have avoided the falldowns or timber shortages that now occur.

One thing that is self evident is that any sustained yield program must include an evenly planned use of the highly profitable timber in a constant economically valid mix with the poorer and less accessible forests. This sort of forest utilization was not, and is not, part of our forest management objectives and regulations. What has happened is that stands of timber that have perfectly good wood value, but are costly to get to (when cost-rated on their own), are now rated as inoperable.

Today we can practise a far more intensive level of forest management on economically sound guidelines than we are so far planning to do. Much of the proof of this can be found in the very articles that have appeared in ForesTalk, as well as the documented facts from the 1976 Royal Commission Report and the Federal government's finding on timber shortages.

ForesTalk is doing an exceptionally good job of giving the public an image of the controversies of forest practices and policies, but it and the forestry profession as a whole are shying away from stating the well-known and acknowledged forestry facts and practices on which to make forest, fisheries and wildlife habitat management, and forest recreation policy judgments. Practically every conflict that divides conservationists and the industry could be solved by sound, economically valid forestry practices.

Michael Trew
Victoria, B.C.

Tape Measure Revisited

I must make some corrections to my Collections item in the Summer 1980 issue of ForesTalk regarding record or near-record trees in Vancouver's Stanley Park. Since writing the article I have received an updated copy of the National Register of Big Trees listing a new U.S. champion bigleaf maple which is larger than the two "record" maples I measured in Stanley Park. But Stanley Park still holds a record tree. A red alder found at Third Beach is (as of April 1980) larger than the U.S. champion at Gardiner, Oregon. If ForesTalk readers know of any possible record trees they should contact the Canadian Forestry Association of B.C. in Vancouver and report their findings. This would help establish a list of B.C. record trees.

Randy Stoltmann
West Vancouver, B.C.

Unsolicited

I am not usually moved to write unsolicited (or solicited, for that matter) letters of praise. But in looking through the Summer 1980 issue of ForesTalk I felt the urge to tell you what I have been thinking for some time. You have the best-looking, most thoughtful and interesting publication I have ever read. Some years back I was editor of *Pulp & Paper*, and prior to that I was a field editor of *Forest Industries*. I was then, as now, appalled by the shallowness of forestry magazines. I wished, then and now, that we had a publication of the quality of ForesTalk here in the Pacific Northwest. I particularly like your balanced approach to the issues in forestry. Our interests in the Pacific Northwest are quite similar, so I believe I can appreciate the way you treat such subjects as "overcutting." Keep up the good work.

Michael D. Sullivan
Director of Public Affairs
Industrial Forestry Association
Portland, Oregon

The Truth About Palms

"Once Waxed Tall" in the Collections section of the Summer 1980 issue of ForesTalk made reference to a palm as being a tree. Plant physiologists consider cambial activity as the method trees use to thicken their roots. Palms produce an abundance of roots at the base of the stem rather than thickening the existing roots. On this basis palms can be considered to be tree-like plants, but definitely not trees.

Paul Birzins
Seed Orchard Forester
Skimikin Nursery
Tappen, B.C.

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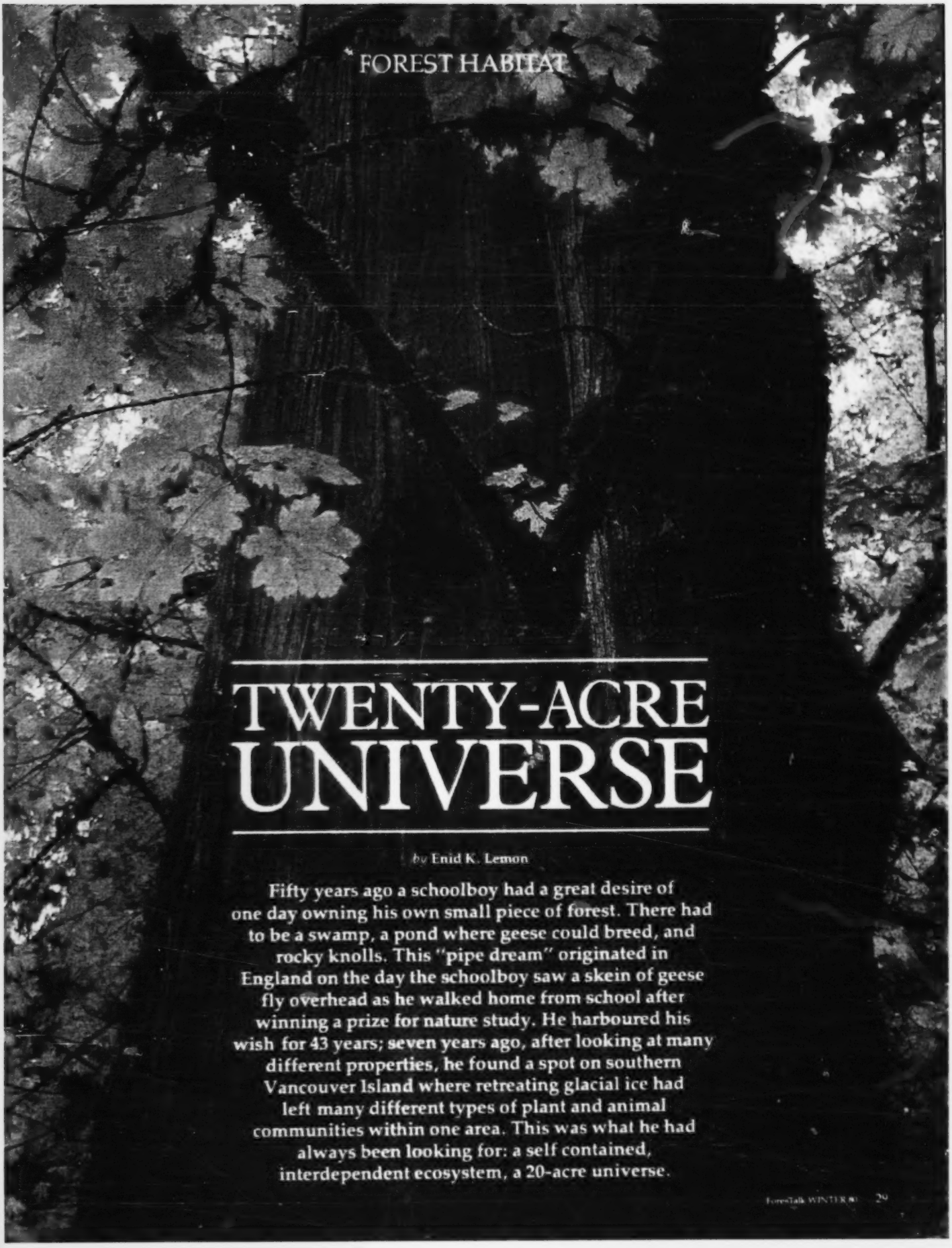


TWENTY-ACRE UNIVERSE

by Enid K. Lemon

Fifty years ago a schoolboy had a great desire of one day owning his own small piece of forest. There had to be a swamp, a pond where geese could breed, and rocky knolls. This "pipe dream" originated in England on the day the schoolboy saw a skein of geese fly overhead as he walked home from school after winning a prize for nature study. He harboured his wish for 43 years; seven years ago, after looking at many different properties, he found a spot on southern Vancouver Island where retreating glacial ice had left many different types of plant and animal communities within one area. This was what he had always been looking for: a self contained, interdependent ecosystem, a 20-acre universe.

One part of the property is dominated by western red cedar, whose fluted trunks and weirdly-shaped branches remind one of the Arthur Rackham illustrations in "Peter Pan." There are also willows and skunk cabbage (*Lysichitom amerivanum*), or yellow arum. Their tiny bright yellow flowers form a club-like spike partially surrounded by a large yellow spathe. The pussy willow, whose beautiful fluffy catkins are one of the earliest signs of spring, is found towards the edge of "Rackham Swamp."

In an area of sword ferns grows a fine Douglas fir specimen. This is a "plus tree," one of a select number of trees throughout the province so identified by the Ministry of Forests' Research Branch. In 1979, fourteen twigs, or scions, from the 120-year-old plus tree (number 796) were grafted onto root stock at the Ministry's Cowichan Lake Research Station to be used in long-range tree improvement projects. Plus tree 796 is only the second such tree on Vancouver Island to be brought to the Ministry's attention by a private citizen.

Many thousands of years ago, a depression was formed in the forest floor to create a lake of about seven acres. The retreating ice left alluvial deposits which increased annually with the run-off from the adjacent hills. In time the lake filled in to form a bog. Seven years ago interconnecting channels were dug out of the peaty soil to make waterways for a greater abundance of wildlife. With the alteration in water level the hardhack and willow have extended their range, but are kept in check by a deeply cut channel. Yellow-throated warblers find the dense vegetation ideal for nesting sites.

The 20-acre universe is an area of fairly heavy rains, and the drainage basin rises sharply in winter months. In 1975 a dam was built to control the water level. All dams in B.C., however large or small, must be registered with the Ministry of Environment. Surely this dam — 35 feet long with a sluice box three feet wide and high — must be one of the smallest registered dams in the province.

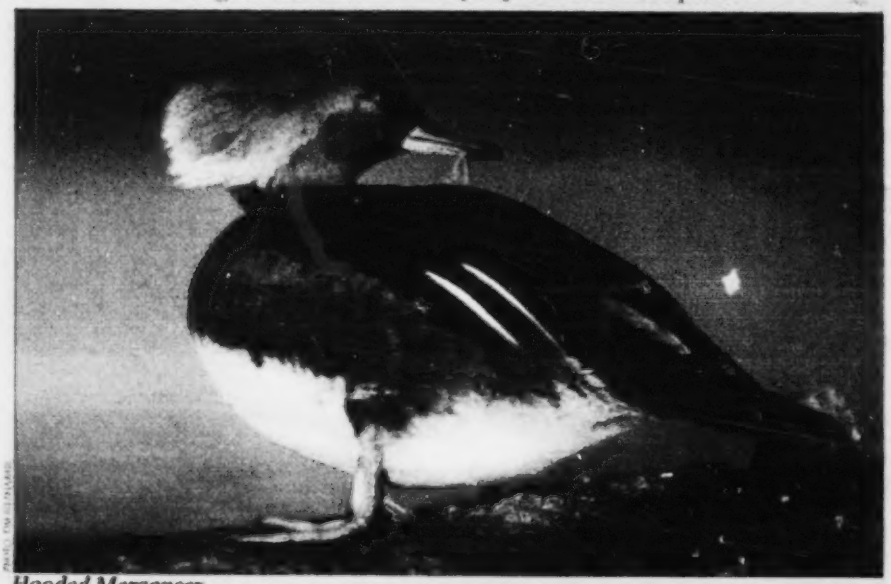
The marsh area occupies the edges of the channels and shallow bays. It is composed of sedges, marsh grasses, bullrushes and cattails which provide cover and food for many species of birds, as well as for muskrats and amphibians. It is also the breeding ground for mosquitoes, which are eaten in millions by the swallows and other insectivorous birds. Various species of dragonflies, which are on the wind from May onward, add to the beauty of the pond and its forested edges. They also consume vast quantities of biting insects.

The frog chorus starts in March and continues until July. The chief choral member is the male Pacific tree frog (*Hyla regilla*) which is less than two inches long. To make its remarkably loud sound, it swells its throat to three times its head size, and its resonating skin amplifies the noise. When in full song the chorus will last from dusk to dawn. By mid-July the young tree frogs are ready to leave the water to spend most of their lives on shrubs and deciduous trees. The sapling alders near the pond are their favourite home; with adhesive pads on their toes they have no difficulty clinging to the shiny leaves.

Spring is an incredibly busy time for the bird population at the 20-acre-universe. Mallards are nesting at the edge of the forest, perhaps amongst the salal. The nesting site may be 50 or more feet from the water, and these tiny ducklings have to make it through what must seem to them enormous trees to take their first swim.

Around the pond, attached to the trees at suitable heights, are a number of large nesting boxes to encourage hole-nesting ducks. There are quite a number of these, including the beautiful wood duck and hooded merganser. The tall trees also supply suitable nesting sites for horned owls, often in old red-tailed hawk nests. The woods are home as well to Townsend warblers, chestnut-sided chick-adees, red-breasted nuthatches, woodpeckers, and any number of other species.

One sunny spring day when the sap in the red alders was running freely, a yellow-bellied sapsucker



Hooded Merganser

Yellow-bellied Sap-sucker

Pacific Tree Frog

Skunk Cabbage

was making its neat rows of oblong cuts into the cambium to get to its favourite food. Having girdled the sapling many times, it repeated the operation on four more trees. Now the sap was flowing freely from the first tree, so back the bird went to take a drink. He then went from tree to tree as the liquid from each began to flow. Altogether this smart member of the woodpecker family girdled 20 small saplings, repeating the same operation four times over. Then off it flew with a belly full of sap.

Autumn is the time for the deciduous trees and shrubs to change from their green leaves to various fall colours; the gold of the

Dragonfly

broadleaf maple and the pinkish red of the dogwood. It is also the time of the year when mushrooms show their fruiting bodies on the forest floor.

Winter comes; the pond freezes over. The muskrats have taken a sufficient supply of vegetation into their burrows in the banks of the pond to see them through the winter. The winter resident birds are busy keeping body and soul together. The amphibians have found themselves their sheltered spots. Everything is quiet in the 20-acre universe. Only a goshawk is spotted on one of the dead cedars, looking over this small piece of forest — once an English schoolboy's dream and today his sanctuary.

Province of British Columbia
Ministry of Forests
HONOURABLE TOM WATERLAND, MINISTER

Where's the Free Firewood?

The Ministry of Forests traditionally has provided the public with access to firewood on Crown land. To get this wood the firewood hunter must first apply for a *free use permit* at a Ministry district office. From there he will be directed either to a recent logging show where standing trees or piled slash are in need of clearing so the site can be planted, or to a *free use area*, or even to a Hydro right-of-way. He will also have to buck, split and haul his own wood. Likely, he will be limited to taking out a cord or two.

Because of a skyrocketing demand, free firewood from Crown land is in very short supply in many areas, especially around Vancouver and Victoria. Last year the Port Moody office was getting 10 to 20 inquiries a day and had to restrict the number of permits it issued; a field office near Nelson issued more than 400 permits last winter compared to the usual 20 or so.

So consider the reliability of your local wood supply before you buy that chain saw. If you live in the Vancouver area you can be sure of getting firewood only up the Fraser Canyon and in the backwoods of the Sechelt Peninsula. If you live in the lower Vancouver Island area you may have trouble acquiring firewood within a 50-kilometre radius. Further up-country you still may have to drive 30 or more kilometres to the nearest designated firewood-cutting area. (And remember to have your Forest District permit with you while you're cutting and hauling.)

If you're a novice woodcutter, be sure to ask for the Ministry's pamphlet "Cutting Free Firewood." It offers a short course on safe, hassle-free ways of bucking downed logs. And good luck!

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